QA/QC Checklist, Boiler Tube Block (BTB2).

Purpose of Checklist:

This checklist is provided to ensure the correct installation of the Boiler Tube Block (BTB2), helping deliver accurate temperature readings and giving the sensor the best chance of surviving the punishing environment of fired-heater until at least the next scheduled turnaround.

When to use this Document:

Use this checklist before, during and after installation. If any item is incomplete or unclear, stop and resolve.

How to use this Checklist:

Each of the next three pages covers a key installation phase: Welding, Routing, and Wiring. Review each item carefully and check off only when complete.

Why it Matters:

Improper installation can lead to inaccurate temperature readings or premature sensor failure. This checklist helps protect your work, your team, and the equipment.

Aircom Instrumentation Ltd.

Section: Tube Metal Temperature Sensors
File: BTB Quality Assurance Checklist

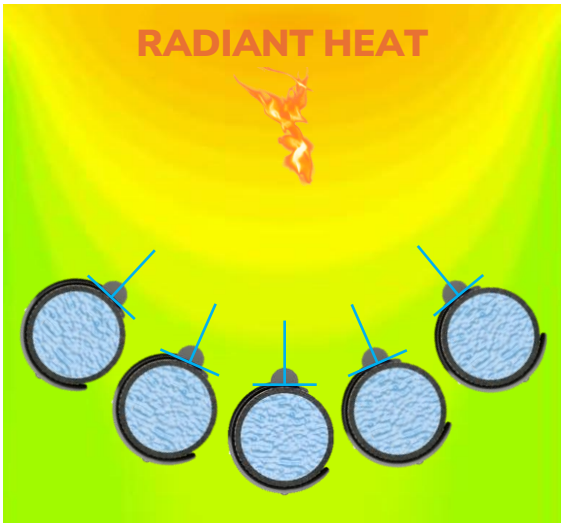
Aircom Instrumentation Ltd.
9328-37 Avenue NW
Edmonton, AB T6E 5W3
Ph: (780) 434-6916
Sales@AircomInstrumentation.com
www.AircomInstrumentation.com

Checklist – Welding Boiler Tube Block.

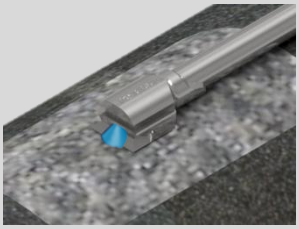
ORIENTATION OF BTB.

Perpendicular to Radiant Heat.

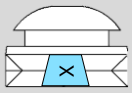
- ☐ **Locate** both the desired tube(s) and their specified measurement locations.
- ☐ Ensure that the measurement location is **outside of the flame impingements radius**.
- ☐ Locate flame source and install BTB2 with sensor tip **facing directly toward heat**.



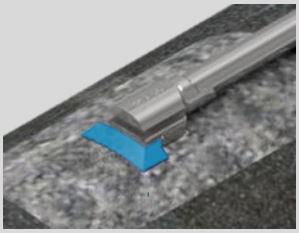
TACK-WELD ON 'X'



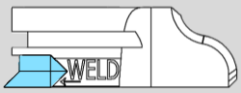
Front View



WELD-THE-GROOVE



Side View



WELDING OF THE BTB.

As simple as Position & Weld.

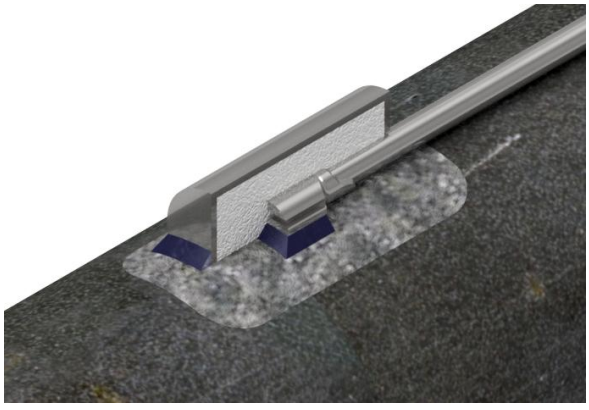
- ☐ **Clean the surface** of the tube at all marked welding locations with approved tool.
- ☐ **Tack-weld the embedded 'X'** on the front of the Boiler Tube Block (BTB2).
- ☐ **Weld the groove around the front** of the BTB, from 'WELD -> to <-WELD'.

USE OF HEAT-SHIELD.

Ideal Use Case, If Applicable.

Use a Heat-Shield if within the **radiant section**, and tube O.D. is **greater than 2"**:

- ☐ **Insert insulation** within heat-shield.
- ☐ **Center BTB2** within heat-shield.
- ☐ **Weld the front & sides** of heat-shield.

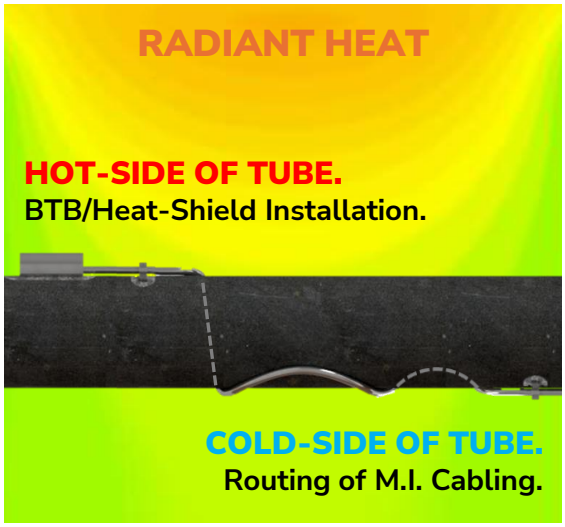


Checklist - Routing of M.I. Cabling.

COLD-SIDE OF THE TUBE.

Mitigating Heat-Based Fatigue.

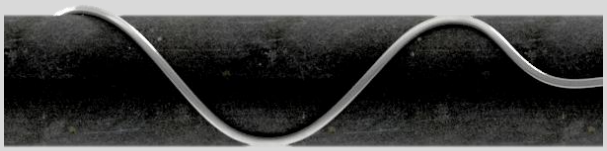
- ☐ BTB2 and M.I. Cable **must be kept clear of direct flame -** no exceptions.
- ☐ M.I. Cable **must directly contact** the cold-side of tube as much as possible.
- ☐ **Insulate** unsupported/unshielded lengths to shield from damaging heat-fatigue.



EXPANSION JOINTS.

Plan for Thermal Expansion.

Bottom View



- ☐ There must be at least **one expansion joint used** at any point within the fired-heater.
- ☐ The Expansion Joint has **gentle bends**, and its **form maintains contact** with the tube.
- ☐ Each bend is a potential **failure point**; number of bends to be **kept to a minimum**.

SUPPORT GUIDES.

Allow for Unrestricted Movement.

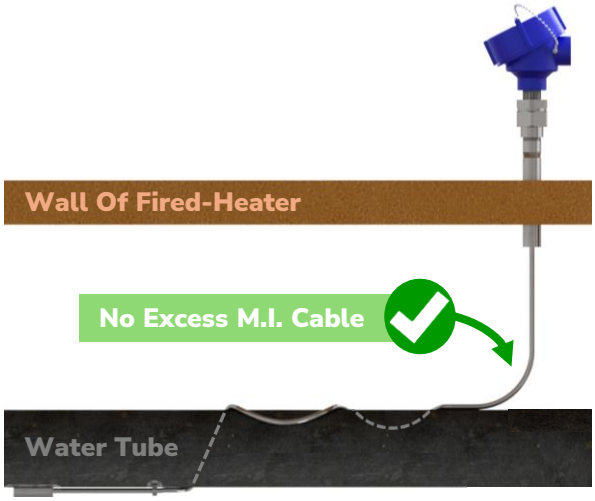
- ☐ Install **Support Guides** at the **BTB2**, as well as before & after the **expansion joints**.
- ☐ Install Support Guides **every 0.6m (2ft)** on straight runs, if applicable.
- ☐ Support Guides are to be **non-binding** and must allow for unrestricted movement.

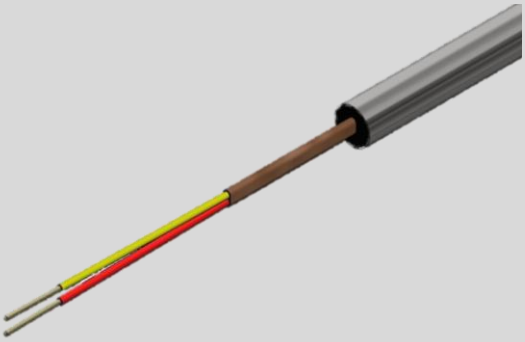
Checklist – Cable Management & Wiring.

EXITING FIRED-HEATER.

Keep the Heat in the Fired-Heater.

- ☐ **Perform function test** (i.e., loop resistance) to ensure operability before exiting heater.
- ☐ **Pull all excess M.I. Cable** through fitting to minimize unsupported length in heater.
- ☐ **Ensure all required fittings and/or seals** are installed to isolate from escaping heat.





SPLICE & TERMINATE.

Cutting and Splicing M.I. Cable.

- ☐ Ensure BTB2 welding and M.I. routing are **completed correctly** before splicing.
- ☐ If necessary, **match colours and polarities** (e.g., magnetic '+ve' to '+ve') and splice.
- ☐ **Keep conductors electrically separated** by insulating wire from each other.

SEAL AND TERMINATE.

Installation and Commissioning.

- ☐ **Perform function test** (i.e., loop resistance) before sealing the M.I. Cabling procedure.
- ☐ Keep moisture away from M.I. Cabling and **seal off exposed M.I. Cabling with epoxy**.
- ☐ **Terminate** lead wires, **configure** system for T/C-Type (e.g., Type-K), and **test system**.